2.3.11. Maximum Acquisition Range

2.3.11.1. Purpose

The purpose of this test is to determine the maximum range at which the radar, if equipped with an STT mode, can acquire a track and to assess the effect that this parameter has upon intercept tactics.

2.3.11.2. General

Radar tracking is discussed in the radar theory section. Even with a TWS mode, once a target is chosen for intercept, it is often appropriate to establish an STT to increase the detection level and quality of the course, speed and altitude calculations. In addition, many radars will optimize the PRF and range scales automatically once an STT is acquired and tracking begins. It is desirable to be able to establish an STT immediately upon detection to allow the greatest intercept flexibility.

2.3.11.3. Instrumentation

Data cards and an optional voice recorder are required for this test.

2.3.11.4. Data Required

Following a maximum detection range data point, record the radar and air-to-air TACAN derived ranges at which an STT can be established. During mission relatable intercepts, record qualitative comments concerning the effects that the maximum acquisition range has upon intercept tactics.

2.3.11.5. Procedure

Perform a maximum detection range test. After the PD=0.5 point, attempt to designate the track for STT. If unsuccessful, allow the detection level and antenna scan pattern to stabilize for a couple of scans and then attempt again. Continue until an STT is acquired. Record the acquisition range as displayed on the radar and the air-to-air TACAN.

2.3.11.6. Data Analysis and Presentation

Adjust the maximum acquisition range for the target radar cross section as per the maximum detection range section 2.3.9. It should be noted that the maximum acquisition range can sometimes vary greatly from one data point to the next. Usually, a statistically significant set of data points are required. Sample size selection depends mainly upon the variance of the measurements from one test to the next and is discussed in detail in references 43 and 72.

For a non-TWS radar, relate the availability of an STT at long range to the requirement for course and speed information to optimize intercept geometry and even to evaluate the level of threat that the target poses (a high speed inbound target usually is more urgent than one heading away). For TWS radars, relate the accuracy of the tracking parameters and the probability of continuous detection all the way to intercept, to the optimization of intercept tactics. If the detection and acquisition ranges are near equal, the STT range is optimized.

2.3.11.7. Data Cards

A sample data card is provided as card 15.

CARD NUMBER ___ TIME ____ PRIORITY L/M/H

MAXIMUM ACQUISITION RANGE

[PERFORM A MAXIMUM DETECTION RANGE TEST. AFTER THE PD=0.5 POINT IS TAKEN, ATTEMPT STT. REPEAT UNTIL THE STT IS ESTABLISHED. RECORD THE RADAR AND AIR-TO-AIR TACAN RANGES.]

RADAR STT RANGE	TACAN STT RANGE

[EVALUATE THE EFFECTS OF THE MAXIMUM ACQUISITION RANGE DURING MISSION RELATABLE INTERCEPTS.]

EFFECTS:

Card 15: Maximum Acquisition Range Data Card